Amflow®

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INSTALLATION & SERVICE MANUAL

AMFLOW® AM11A
Flow Control Valve

Part Number: 00001990-0501

NOTE:
Reference the “As Built” data sheet supplied with order for specific valve configuration.

Explanation of Graphic Symbols

DANGER AND/OR WARNING
The exclamation point within an equilateral triangle surrounded by red is intended to alert the user to the presence of important operating and maintenance instructions that may cause personal injury or harm to the system.

CAUTION AND/OR IMPORTANT
The exclamation point within an equilateral triangle that is solid yellow with an exclamation point is intended to alert the user to use caution or contains important information.

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US PATENTS: 5,427,139 * 5,494,070 * 6,189,564,B1 * EU PATENT 1110132

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END OF SECTION

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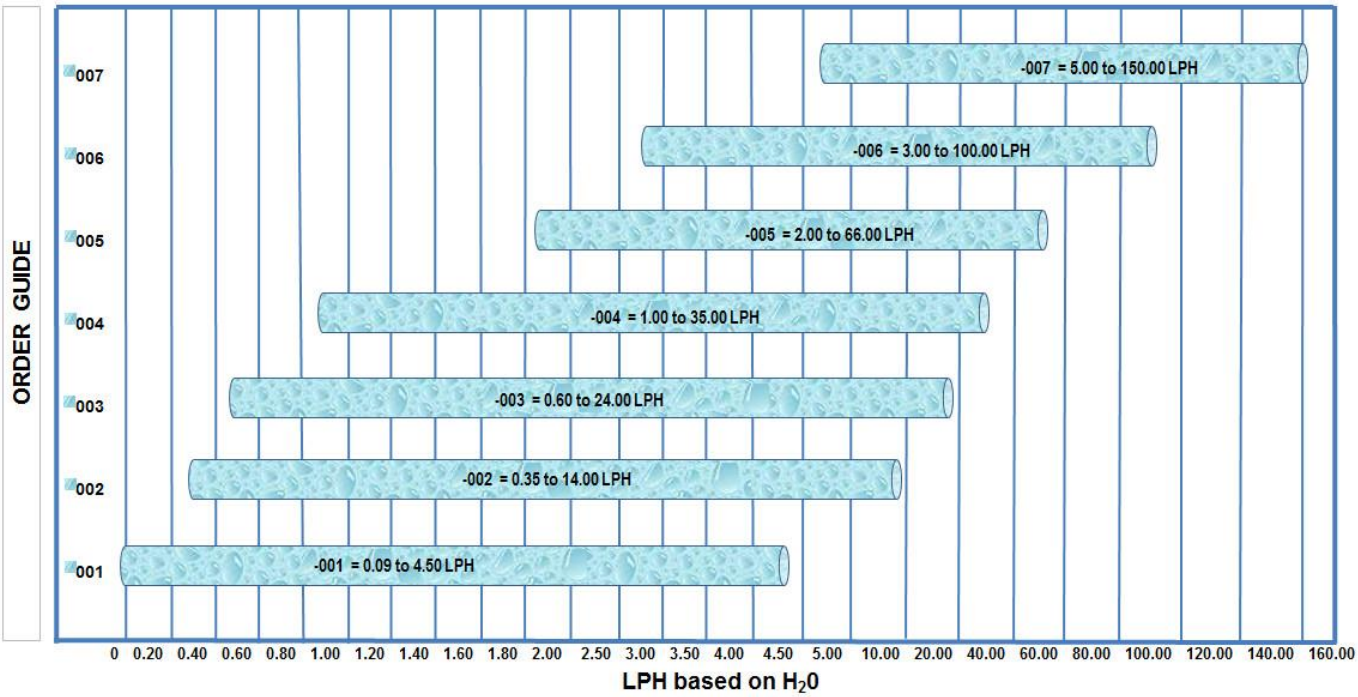
SECTION 1: INFORMATION

1.01 DESCRIPTION

The ***Amflow®*** AM11A Flow Control Valve is an adjustable device for flow regulation from 0.09 to 150 LPH. It is easily adaptable for automation.



The ***Amflow®*** AM11A Flow Control Valve is designed to be mounted in a stainless steel panel with a minimum thickness of 2mm. The mounting hole should be from 34mm to 38mm in diameter.

Incorporated into the ***Amflow®*** AM11A Flow Control Valve is a purge port that allows the user to direct a high flow stream of chemical across the fixed orifice in order to flush any chemical residue that might accumulate over time. This feature reduces the necessity of opening the valve and cleaning the jet manually. The purge port is located 180- degrees from the inlet port. The inlet and outlet ports are at a 90-degree orientation to each other. The body section that contains the outlet port can be rotated 180-degrees to change the relative port orientations to facilitate installation requirements.

1.02 DESIGN FEATURES

- Construction: 316L Stainless Steel
- Operating Pressure: 20-bar (300 PSI) to 920-bar (13,340 PSI)
- Operating Temperature: -15°C (5°F) to 200°C (392°F)
- Standard Inlet & Outlet Ports: SF562CX Medium Pressure
- Turndown Ratio: Up To 40:1 at 10-bar Δp
- Weight: 13 lbs. (5.9 Kg)
- Ceramic components for high pressure control
- Low maintenance
- Very low torque is required for adjustment

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1.03 SAFETY INFORMATION

SAFETY INFORMATION

Usage

- Use valve only within range of pressure and temperature conditions indicated on product data sheet.
- Do not use with chemicals which are incompatible with 316L or with seal materials.
- Equipment is certified for Group 2 Category II.
- Equipment should not be used in systems requiring a higher level of certification.

Faults and Damage

The safety features and integrity of valve may be compromised by any of the following:

- External damage to valve body.
- Exposure to pressure loads in excess of maximum rated pressure.
- Maintenance performed by improperly trained personnel.

Protection from Pressure Releases

- To avoid injury due to release of high pressure, use only adaptors and fittings rated to withstand appropriate pressure.
- Confirm that all adaptors and fittings are securely connected.
- To avoid a violent release of pressure, slowly bleed off pressure before attaching or removing valve from pressure line.

Avoid Mechanical Damage

- Caution must be observed to not damage any threaded components during maintenance procedure. Such damage could compromise the pressure safety factor of valve.
- When replacing seals, care must be used to avoid damage to sealing surfaces. Damage could lead to a sudden release of pressure during operation of valve.
- Any time the twelve (12) M10 x 30 SHCH (Item 40) or eleven (11) M10 x 30 SHCS (Item 40) are loosened or removed they should be tightened to the appropriate torque setting of 150 inch lbs. (17N.m) upon replacement.

END OF SECTION

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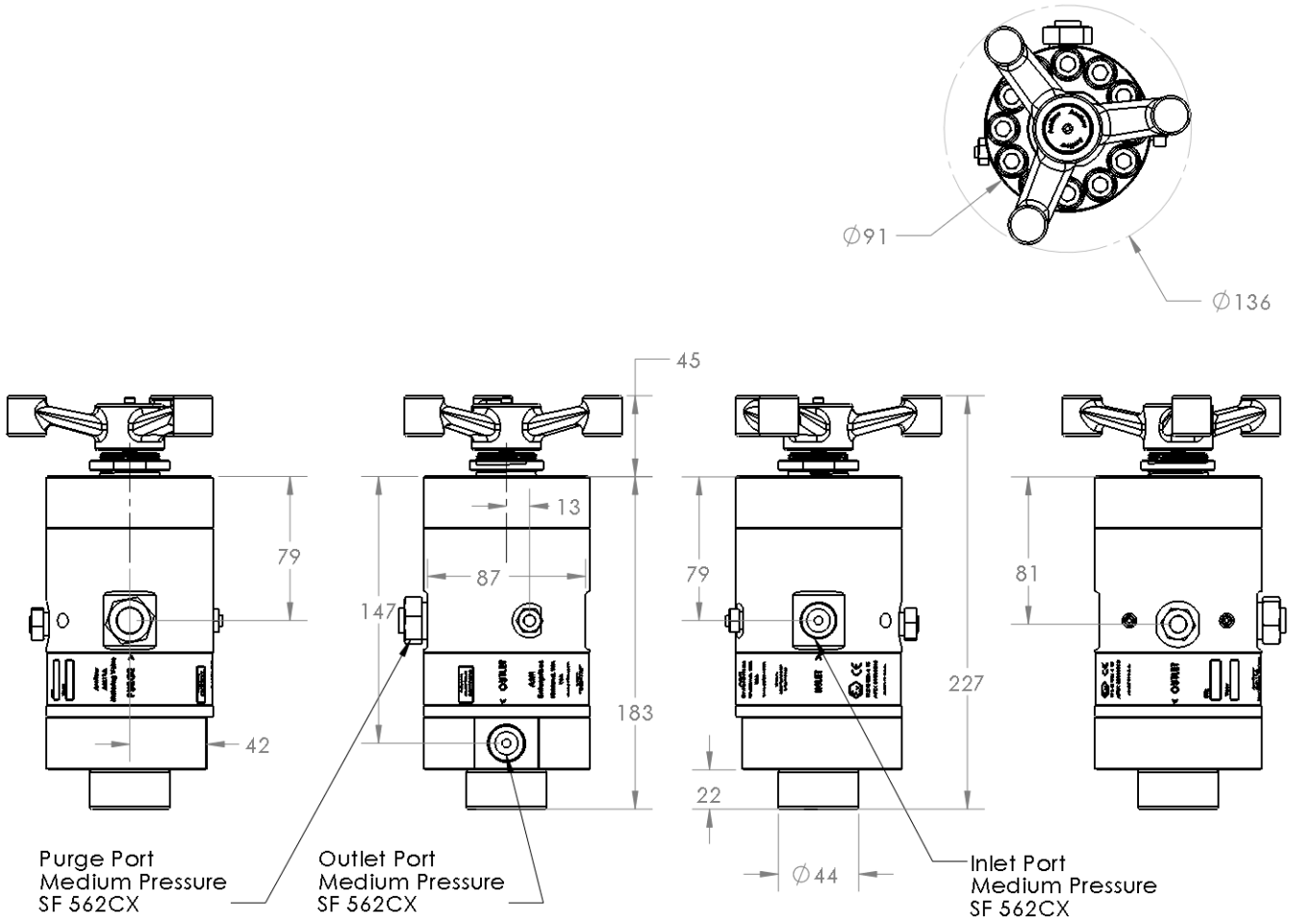
1.04 GA DRAWING



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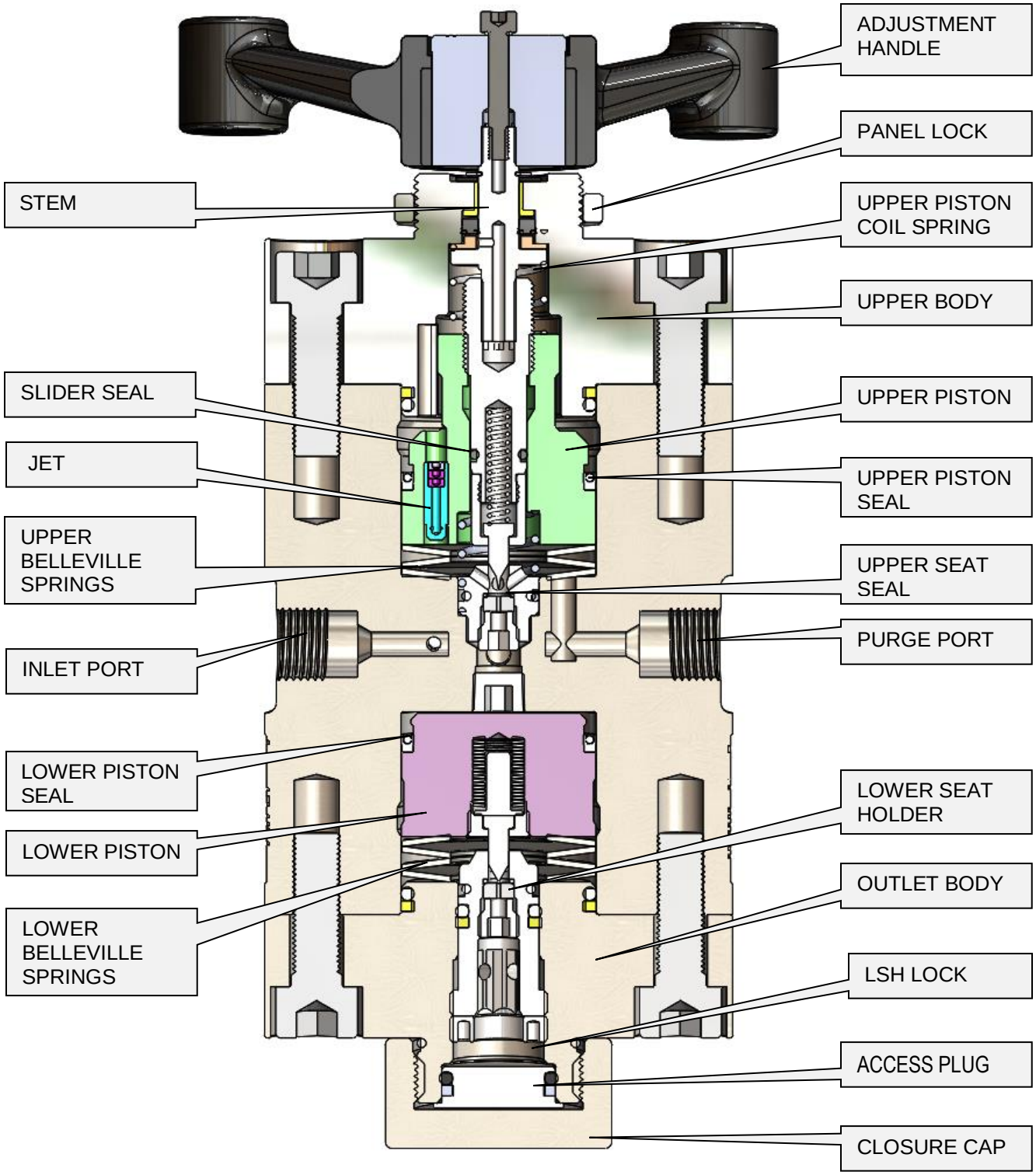
1.05 CUT-AWAY VIEW: Full Assembly



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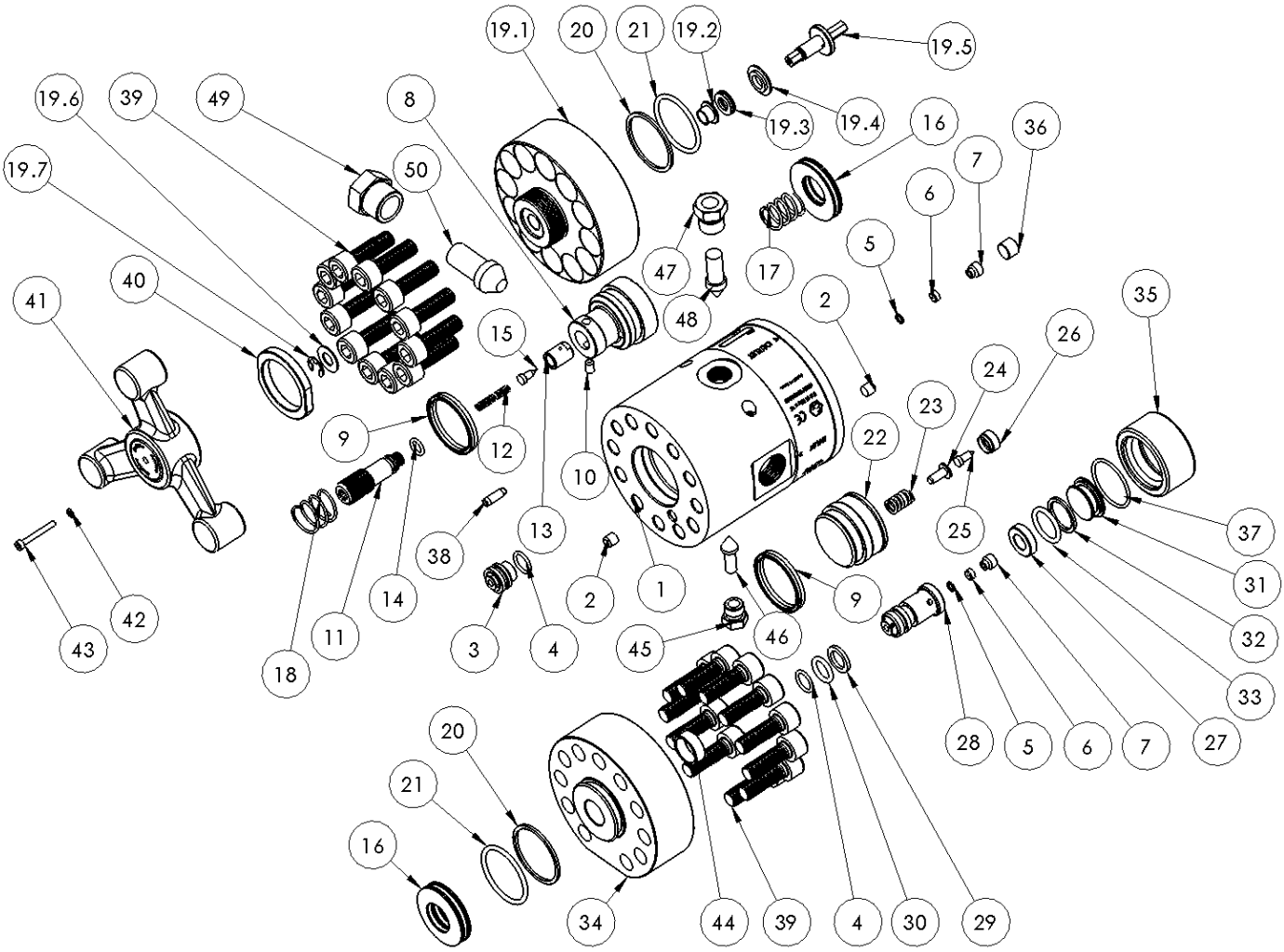
1.06 EXPLODED VIEW



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1.07 BOM

ITEM	PART	DESCRIPTION	QTY
1	00001991-0301-001	Center Body	1
2	00000160-0301-000	CB Plug	2
3	00000083-0301-001	Upper Seat Holder	1
4	00001555-2013-003	Upper Seat Holder O-Ring & Lower Seat Holder Guide	2
5	00000092-0301-002	Seat Seal	2
6	00000093-0301-XXX	Seat	2
7	00000094-0301-001	Seat Retainer	2
8	00000132-0301-XXX	Upper Piston	1
9	00000146-0301-002	Piston Cup Seal	2
10	00000135-0301-000	Anti-Rotate Pin	1
11	00000136-0301-001	Slider	1
12	00000138-0301-000	Upper Pin Spring	1
13	00000137-0301-000	Pin Retainer	1
14	00001555-2011-104	Slider O-Ring	1
15	00000054-0301-XXX	Upper Pin	1
16	00001600-1500-045-00-0755	Belleville Springs	7
17	00000149-0301-000	Piston Coil Spring	1
18	00001927-0301-000	Upper Piston Coil Spring	1
19	00001996-0401-000	Upper Body Assy	1
19.1	00001992-0301-000	Upper Body	1
19.2	00001076-0301-000	Stem Bushing	1
19.3	00000009-0301-000	Stem Cup Seal	1
19.4	00000005-0301-000	Stem Rub Washer	1
19.5	00001075-0301-000	Stem	1
19.6	00000272-0301-000	Clip Washer	1
19.7	00000273-0301-000	Stem Clip	1
20	00002360-0301-000	Upper & Outlet Body Back-Up Ring	2
21	00001555-2125-007	Upper Body & Outlet Body O-Ring	2
22	00000140-0301-000	Lower Piston	1
23	00001997-0301-000	Lower Piston Spring	1
24	00001923-0301-000	Lower Pin Spacer	1
25	00000054-0301-XXX	Lower Pin	1
26	00000549-0301-000	Pin Enclosure	1
27	00000153-0301-000	LSH Lock	1
28	00001994-0301-000	Lower Seat Holder	1
29	00001555-8111-003	Lower Seat Holder Back-Up Ring	1
30	00001555-2111-003	Lower Seat Holder O-Ring	1
31	00001995-0301-000	Outlet Plug	1
32	00002361-0301-010	Outlet Plug Back-Up Ring	1
33	00001555-2115-007	Outlet Plug O-Ring	1
34	00001993-0301-002	Outlet Body	1

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ITEM	PART	DESCRIPTION	QTY
35	00000145-0301-000	Cap Closure	1
36	00000030-0301-000	Plug, NPT - 1/8	1
37	00001555-2024-000	Cap Closure O-Ring	1
38	00000516-0401-000	Jet Assy	1
39	00001500-7010-030-00	M10 x 30 SHCS	23
40	00000015-0301-000	Panel Lock	1
41	00000560-0401-001	Handle Assy	1
42	00001500-8003-000-00	M3 Lockwasher	1
43	00001500-7003-025-00	M3x25 SHCS	1
44	00002091-0301-000	Lower Piston Spacer	1
45	00001356-0301-000	Retainer, 1/4 MP 20M	1
46	00001355-0301-000	Plug, 1/4 MP	1
47	00001421-0301-007	Retainer, 3/8 MP 20 MP	1
48	00001421-0301-008	Plug, 3/8 MP	1
49	00001421-0301-010	Retainer, SF562CX	1
50	00001421-0301-012	Plug, SF562CX	1

END OF SECTION

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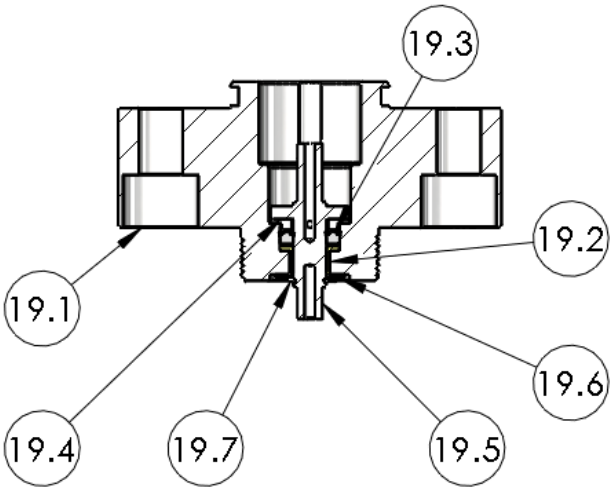
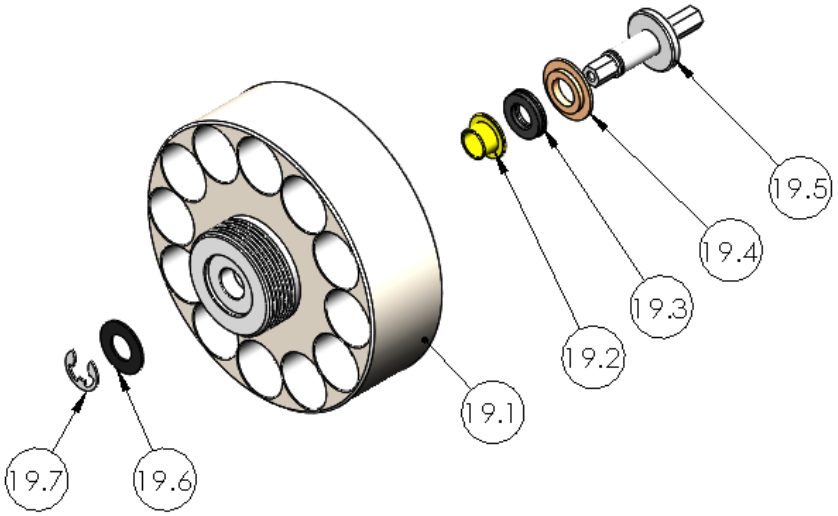
1.08 CUT-AWAY VIEW: Sub-Assembly – Upper Body



1.08a EXPLODED VIEW: Sub-Assembly – Upper Body



1.08b BOM: Sub-Assembly – Upper Body

ITEM	PART	DESCRIPTION	QTY
19.7	00000273-0301-000	Stem Clip	1
19.6	00000272-0301-000	Clip Washer	1
19.1	00001992-0301-000	Upper Body	1
19.2	00001076-0301-000	Stem Bushing	1
19.3	00000009-0301-000	Stem Cup Seal	1
19.4	00000005-0301-000	Stem Rub Washer	1
19.5	00001075-0301-000	Stem	1

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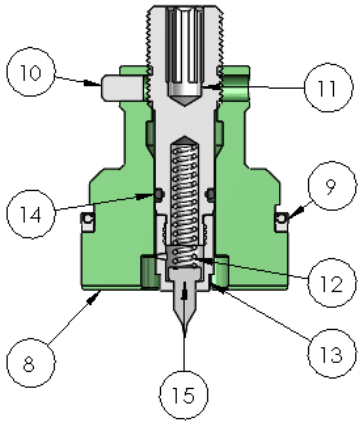
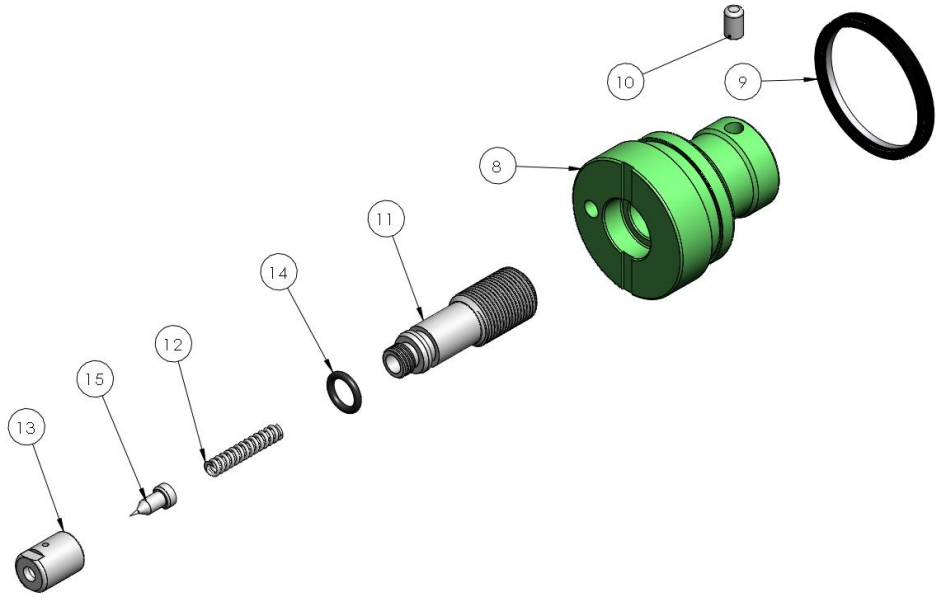
1.09 CUT-AWAY VIEW: Sub-Assembly – Upper Piston



1.09a EXPLODED VIEW: Sub-Assembly – Upper Piston



1.09b BOM: Sub-Assembly – Upper Piston

ITEM	PART	DESCRIPTION	QTY
13	00000137-0301-000	Pin Retainer	1
15	00000054-0301-XXX	Pin	1
12	00000138-0301-000	Upper Pin Spring	1
14	00001555-2011-104	Slider O-Ring	1
11	00000136-0301-001	Slider	1
8	00000132-0301-XXX	Upper Piston	1
10	00000135-0301-000	Anti-Rotate Pin	1
9	00000146-0301-002	Piston Cup Seal	1

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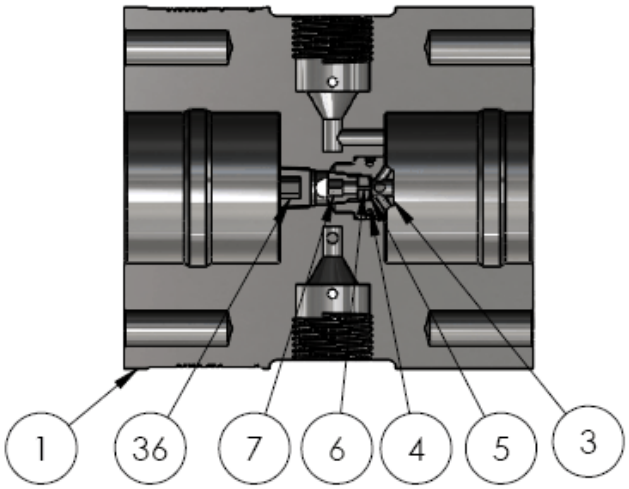
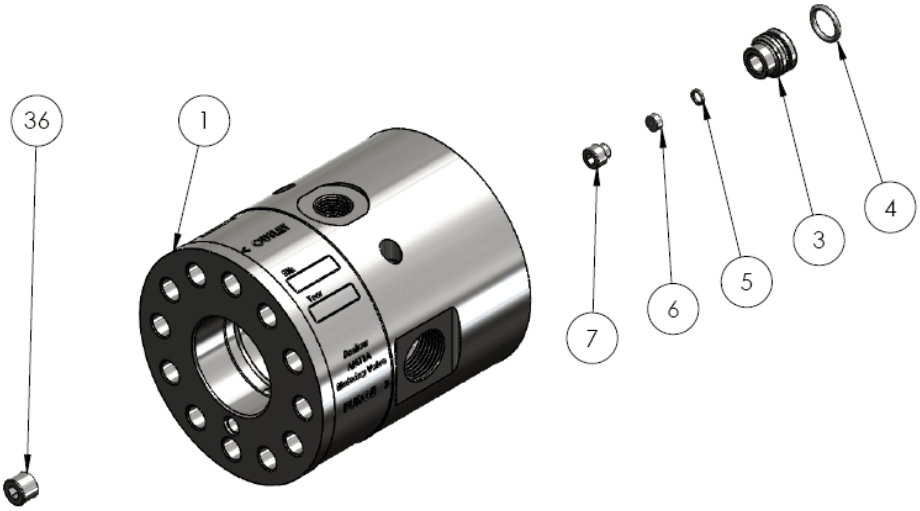
1.10 CUT-AWAY VIEW: Sub-Assembly – Center Body



1.10a EXPLODED VIEW: Sub-Assembly – Center Body



1.10b BOM: Sub-Assembly – Center Body

ITEM	PART	DESCRIPTION	QTY
36	00000030-0301-000	Plug, NPT - 1/8	1
1	00001991-0301-001	Center Body	1
7	00000094-0301-001	Seat Retainer	1
6	00000093-0301-XXX	Seat	1
5	00000092-0301-002	Seat Seal	1
3	00000083-0301-001	Upper Seat Holder	1
4	00001555-2013-003	Upper Seat Holder O-Ring	1

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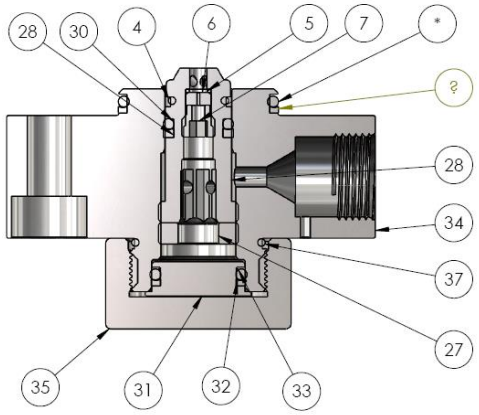
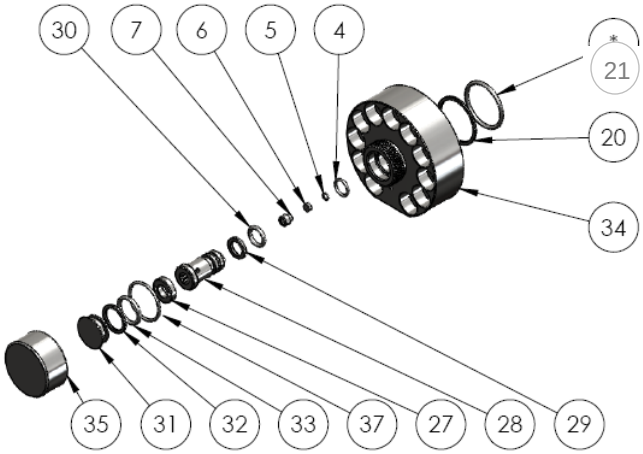
1.11 CUT-AWAY VIEW: Sub-Assembly – Outlet Body



1.11a EXPLODED VIEW: Sub-Assembly – Outlet Body



1.11b BOM: Sub-Assembly – Outlet Body

ITEM	PART	DESCRIPTION	QTY
35	00000145-0301-000	Cap Closure	1
31	00001995-0301-000	Outlet Plug	1
32	00002361-0301-010	Outlet Plug Back-Up Ring	1
33	00001555-2115-007	Outlet Plug O-Ring	1
37	00001555-2024-000	Cap Closure O-Ring	1
27	00000153-0301-000	LSH Lock	1
28	00001994-0301-000	Lower Seat Holder	1
29	00001555-8111-003	Lower Seat Holder Back-Up Ring	1
34	00001993-0301-002	Outlet Body	1
20	00002360-0301-000	Outlet Body Back-Up Ring	1
21	00001555-2125-007	Outlet Body O-Ring	1
4	00001555-2013-003	Lower Seat Holder Guide	1
5	00000092-0301-002	Seat Seal	1
6	00000093-0301-XXX	Seat	1
7	00000094-0301-001	Seat Retainer	1
30	00001555-2111-003	Lower Seat Holder O-Ring	1

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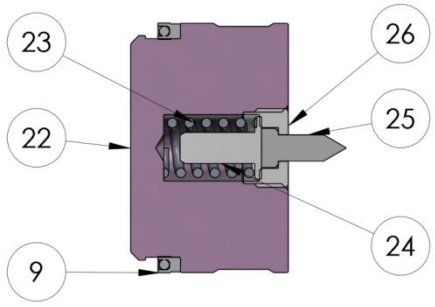
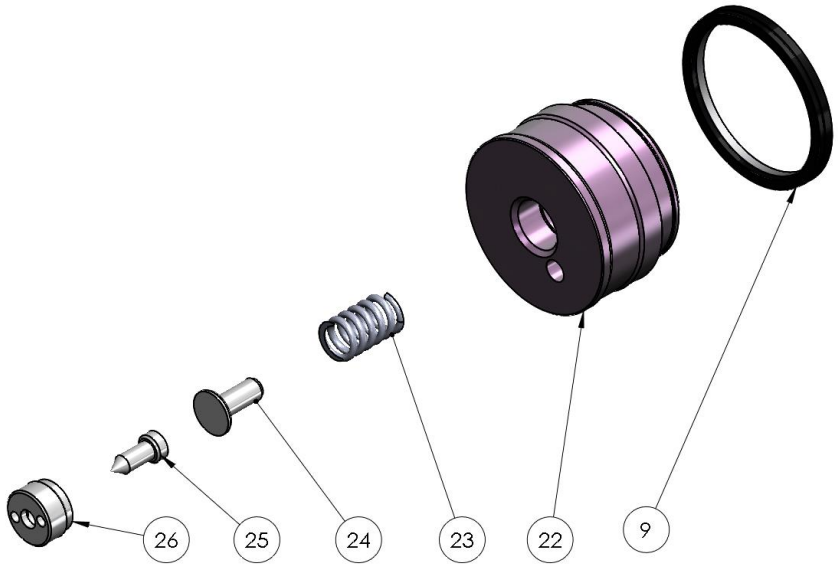
1.12 CUT-AWAY VIEW: Sub-Assembly – Lower Piston



1.12a EXPLODED VIEW: Sub-Assembly – Lower Piston



1.12b BOM: Sub-Assembly – Lower Piston

ITEM	PART	DESCRIPTION	QTY
26	00000549-0301-000	Pin Enclosure	1
25	00000054-0301-XXX	Pin	1
24	00001923-0301-000	Lower Pin Spacer	1
23	00001997-0301-000	Lower Piston Spring	1
22	00000140-0301-000	Lower Piston Sub-Assy	1
9	00000146-0301-002	Piston Cup Seal	1

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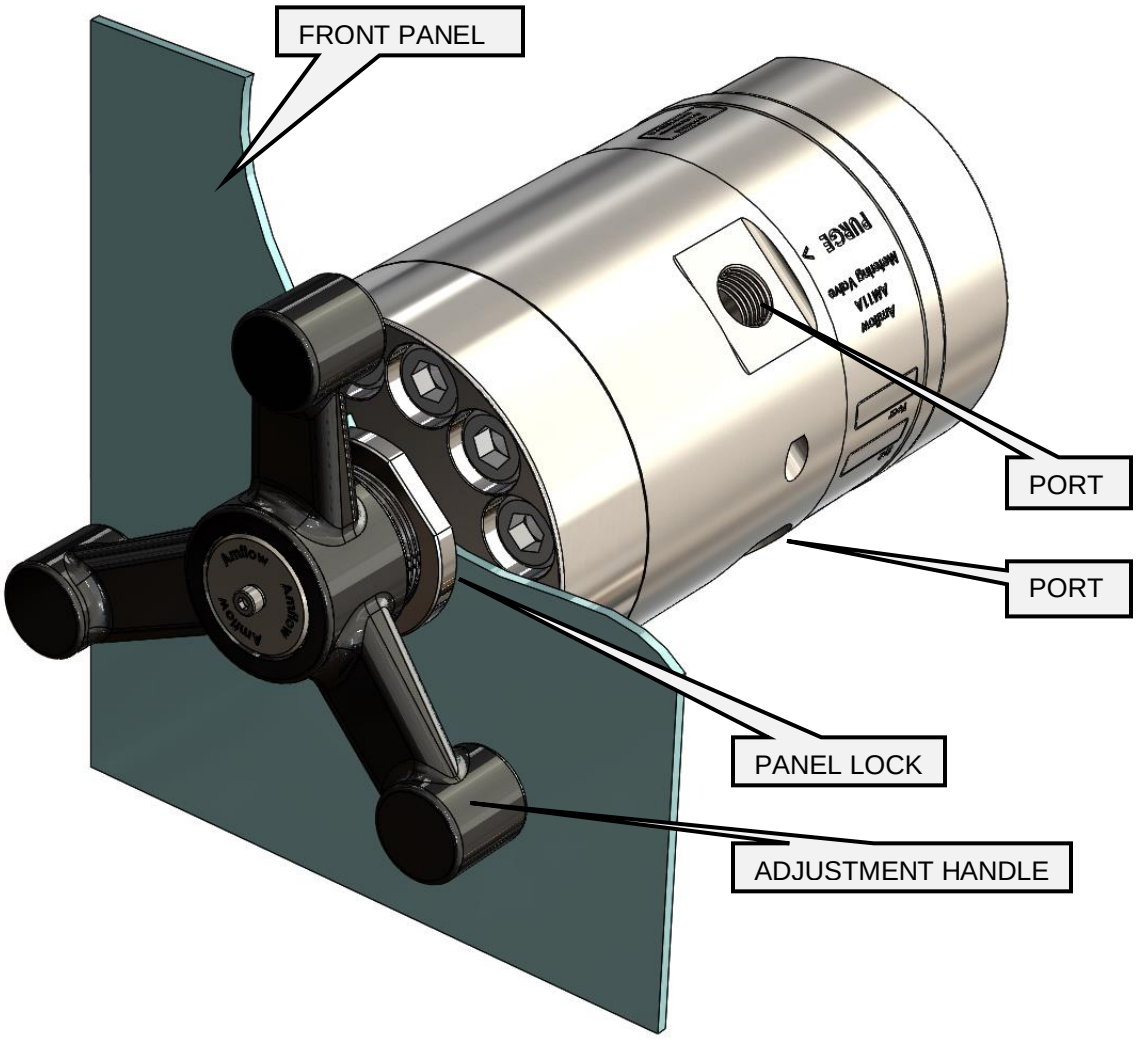
1.13 CUT-AWAY VIEW: Panel Mount



NOTE:
Outlet port may be rotated 180°.
Please notify A&H Enterprises at time purchase order is placed.

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1.13a PANEL MOUNT: Cut-out Dimensions

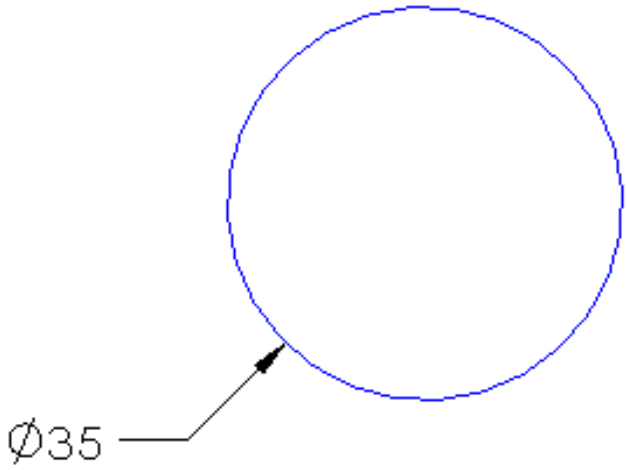

DIAGRAM 1: AM11A Mounting Panel Opening

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SECTION 2: VALVE INSTALLATION

2.01 INSTALLATION PROCEDURE

ADJUSTMENT HANDLE		
41	00000560-0401-001	Handle Assy
42	00001500-8003-000-00	M3 Lockwasher
43	00001500-7003-025-00	M3x25 SHCS

Step 1

- Remove ADJUSTMENT HANDLE (Item 41) from valve by unscrewing M3 X 25 SHCS (Item 43) and LOCK-WASHER (Item 42) located in center of ADJUSTMENT HANDLE (Item 41).

Step 2

- Unscrew PANEL LOCK (Item 40) from threaded neck on UPPER BODY ASSEMBLY (Item 19).

Step 3

- Place valve into prepared hole on mounting panel.

Step 4

- Replace PANEL LOCK (Item 40) and ADJUSTMENT HANDLE (Item 41).

2.02 ⚠ INSTALLATION PRECAUTIONS

Good system design is critical to the optimum operation of the ***Amflow®*** Valves. At a minimum, the design should include:

- Isolation valves located near inlet and outlet ports of the ***Amflow®*** Valve. (The outlet isolation valve is normally a three-way valve that can be incorporated into the calibration loop.)

⚠ **IMPORTANT:** The importance of proper media filtering cannot be overstated. It is **strongly** recommended that filters be placed on both the suction side and the pressure side of pump. It is not unusual to have individual filters inline for each valve. The recommended micron size of the high-pressure filter is somewhat dependent on the specific configuration of any given ***Amflow®*** Valve. However, a 50-micron filter size is generally adequate for most applications.

- The system design should take into consideration that materials which come into contact with the injected media should not contribute to foreign matter entering into the system. This means it is unwise to use material that can be easily corroded, such as mild steels.

- A check valve located on the outlet side of each ***Amflow®*** Valve is strongly recommended. There are a number of reasons for this:
  - The first and most obvious is for safety considerations.
  - The second is to prevent a massive backflow through the ***Amflow®*** Valve.

This backflow can occur if there is a pump failure or some other system failure that would cause a loss of positive pressure across the ***Amflow®*** Valve. The ***Amflow®*** Valve is designed to accommodate some backflow conditions; ⚠ however, piston seal damage can occur if backflow is excessive. The seal is designed to fail under certain conditions in order to prevent damage that is more serious to the valve.

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SECTION 3: START-UP PROCEDURE

3.01 START-UP PROCEDURE

Step 1

- Open ADJUSTMENT HANDLE (Item 41) counter-clockwise to a soft "Stop".
  - ➢ Then, turn one (1) revolution clockwise.

Step 2

- Close Inlet Isolation valve of each valve in system.

Step 3

- Start pump and adjust system pressure to accommodate pressure requirements.
- Apply pressure very slowly upon initial valve start-up.

IMPORTANT
This is especially important for valves configured to flow less than 5 lph.

PROCEED with CAUTION
This is very important, especially at high system pressures, to prevent potential damage to seals and other internal components of valve.

Step 4

- VERY SLOWLY open Outlet Isolation Valve.

Step 5

- VERY SLOWLY open Inlet Isolation Valve. This allows fluid to be introduced gradually.
  - ➢ Once ***Amflow***® Valve is filled with fluid there is little risk of damage.

Step 6

- Allow sufficient time for media to flush any trapped air out of valve.

IMPORTANT
On valves that are configured to meter less that 10 lph it is very important that at least 20 minutes be allowed for this step. Trapped air can cause the set flow rate of valve to diminish slowly.

Step 7

- Once all air is eliminated, bring system up to operating pressure.

Step 8

- Turn valve ADJUSTMENT HANDLE (Item 41) to ensure that it turns easily.

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SECTION 4: OPERATION

A constant flow rate is controlled by maintaining a constant differential pressure across a fixed jet located within the UPPER PISTON (Item 8).

In simple terms, the pressure on inlet side UPPER PISTON (Item 8) is offset by pressure on the outlet side UPPER PISTON (Item 8) combined with the force of BELLEVILLE SPRINGS (Item 16). The force added by BELLEVILLE SPRINGS (Item 16) is controlled by moving SLIDER (Item 11) relative to the UPPER PISTON (Item 8) which has the effect of changing the location of the PIN (Item 15) relative to UPPER SEAT (Item 6).

The following seals keep the process liquid pressure from escaping into the atmosphere:

ATMOSPHERIC SEALS:

- STEM CUP SEAL (Item 19.3) seals between STEM (Item 19.5) and UPPER BODY (Item 19.1).
- BODY O'RING (Item 21) seals between UPPER BODY (Item 19.1) and CENTER BODY (Item 1).
- BODY O'RING (Item 21) seals between CENTER BODY(Item 1) and OUTLET BODY (Item 34).
- OUTLET PLUG O'RING (Item 33) seals between OUTLET BODY (Item 34) and OUTLET PLUG (Item 31).

INTERNAL SEALS:

- PISTON CUP SEAL (Item 9) seals between UPPER PISTON (Item 8) and CENTER BODY (Item 1).
- UPPER SLIDER O'RING (Item 14) seals between UPPER PISTON (Item 8) and SLIDER (Item 11).
- UPPER SEAT HOLDER O'RING (Item 4) seals between CENTER BODY (Item 1) and UPPER SEAT HOLDER (Item 3).
- SEAT SEAL (Item 5) seals between UPPER SEAT HOLDER (Item 3) and UPPER SEAT (Item 6).
- PISTON CUP SEAL (Item 9) seals between LOWER PISTON (Item 22) and CENTER BODY (Item 1).
- SEAT SEAL (Item 5) seals between LOWER SEAT (Item 6) and LOWER SEAT HOLDER (Item 28).
- LOWER SEAT HOLDER O'RING (Item 30) seals between OUTLET BODY (Item 34) and LOWER SEAT HOLDER (Item 28).

IMPORTANT

When replacing any seal, the compatibility with fluid to be metered by valve must be considered. It is strongly recommend using FFKM material.

Please consult manufacturer for further assistance.

END OF SECTION

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SECTION 5: MAINTENANCE

BEFORE CARRYING OUT NEXT ACTIONS

1. Close down system or isolate valve to be removed.

2. Vent all pressure.

5.01 VALVE REMOVAL FROM SYSTEM

Step 1

- Disconnect tubing from Inlet and Outlet Ports.

Step 2

- Remove M3 X 25 SHCS (Item 43) in center of ADJUSTMENT HANDLE (Item 41).

Step 3

- Remove ADJUSTMENT HANDLE (Item 41).

Step 4

- Loosen PANEL LOCK (Item 40) which holds valve to panel.

END OF SECTION

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5.02 OPENING PROCEDURE: Valve

Once valve is removed from system:

Step 1

- Loosen twelve (12) M10 X 30 SHCS (Item 39) which join UPPER BODY (Item 19.1) to CENTER BODY (Item 1).

Step 2

- Carefully pull apart UPPER BODY (Item 19.1) from CENTER BODY (Item 1).

Step 3

- Set aside UPPER BODY (Item 19.1).

Step 4

- Holding CENTER BODY (Item 1) upright; remove UPPER PISTON (Item 8).
  - ➢ It should slide apart easily.

Step 5

- Set aside UPPER PISTON (Item 8).

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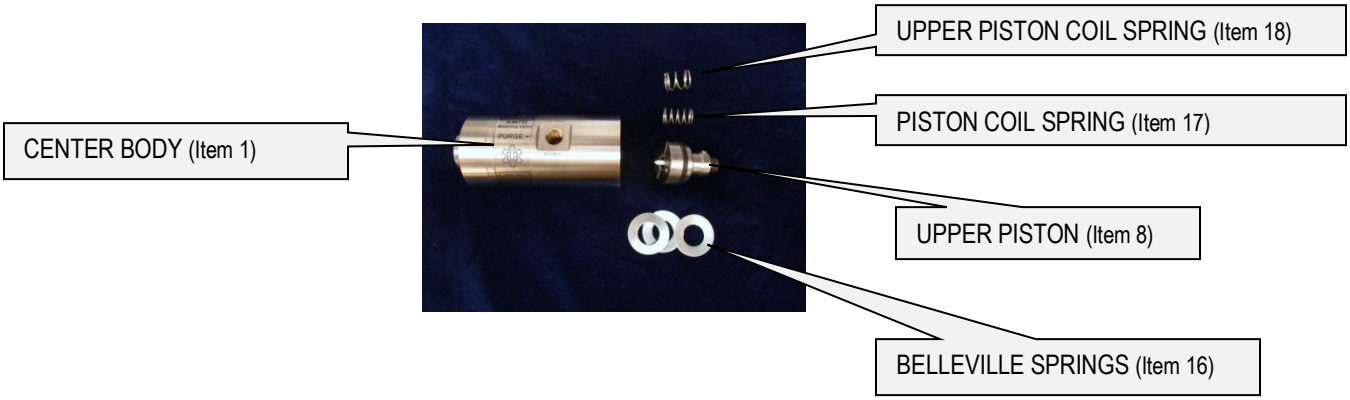
5.02 OPENING PROCEDURE: Valve, continued

Step 6

- Invert CENTER BODY (Item 1) and remove BELLEVILLE SPRINGS (Item 16).

CENTER BODY		
1	00001991-0301-001	Center Body
18	00001927-0301-000	Upper Piston Coil Spring
17	00000149-0301-000	Piston Coil Spring
8	00000132-0301-XXX	Upper Piston
16	00001600-1500-045-00-0755	Belleville Springs
➢ **Also, Ref. Section 1.10**		


UPPER PISTON COIL SPRING (Item 18)
PISTON COIL SPRING (Item 17)
CENTER BODY (Item 1)
UPPER PISTON (Item 8)
BELLEVILLE SPRINGS (Item 16)

END OF SECTION

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US PATENTS: 5,427,139 * 5,494,070 * 6,189,564,B1 * EU PATENT 1110132

SECTION 6: REPLACEMENTS

6.01 REPLACEMENT: Upper Seat

Step 1

- Using 5mm hex wrench, remove 1/8 NPT PLUG (Item 36) located in seat access port of CENTER BODY (Item 1). Ref. PICTURE 1 & 2

PICTURE 1

PICTURE 2

Removed 1/8 NPT Plug (Item 36)

NOTE
Ref. Section 1.10 for parts incorporated into CENTER BODY (Item 41).

Step 2

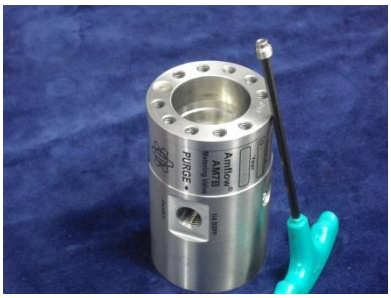
- Using 4 mm hex wrench, remove SEAT RETAINER (Item 7). Ref. PICTURE 3

Step 3

- Remove UPPER SEAT (Item 6) and remnants of SEAT SEAL (Item 5).

Step 4

➢ Remove SEAT SEAL (Item 5) with sharp metal pick.



PICTURE 3

NOTE
Use Service Removable Loctite® when reinstalling SEAT RETAINER (Item 7).

Step 5

- When reinstalling UPPER SEAT (Item 6) note that one edge is chamfered.

IMPORTANT
Step 5

It is important that the chamfered edge of UPPER SEAT (Item 6) be located so that the SEAT SEAL (Item 5) will be crushed into the space between chamfer and counter-bore in UPPER SEAT HOLDER (Item 3).

When UPPER SEAT (Item 6) has been installed, it is necessary to remove any SEAT SEAL (Item 5) that has been extruded into the fluid passageway. This can be accomplished by using a sharp metal pick.

The SEAT SEAL (Item 5) must be replaced **each time** a SEAT (Item 6) is removed as it is designed to be crushed when a SEAT (Item 6) is installed.

END OF SECTION

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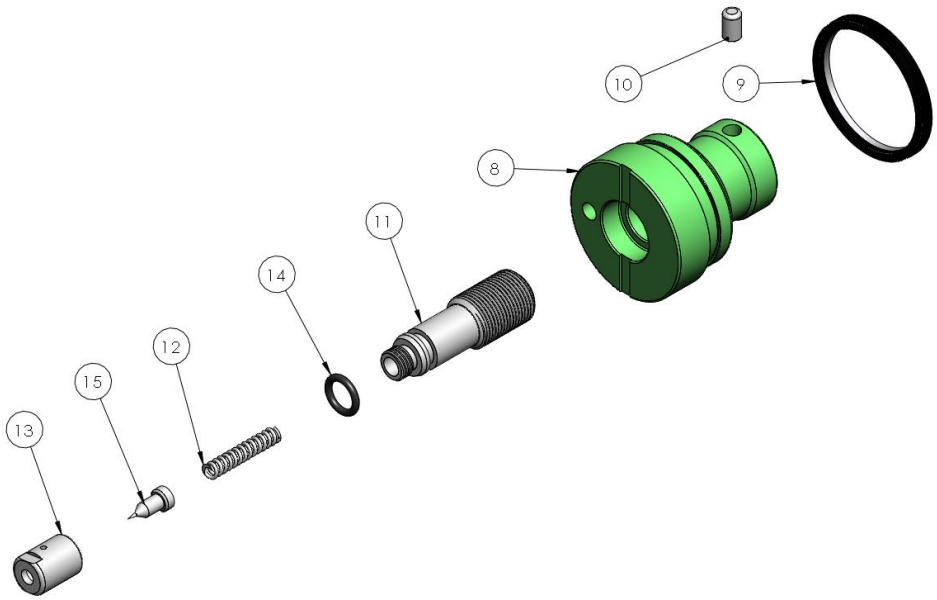
6.02 REPLACEMENT: Upper Pin

UPPER PISTON			
ITEM	PART	DESCRIPTION	QTY
13	00000137-0301-000	Pin Retainer	1
15	00000054-0301-XXX	Pin	1
12	00000138-0301-000	Upper Pin Spring	1
14	00001555-2011-104	Slider O-Ring	1
11	00000136-0301-001	Slider	1
8	00000132-0301-XXX	Upper Piston	1
10	00000135-0301-000	Anti-Rotate Pin	1
9	00000146-0301-002	Piston Cup Seal	1
➢ **Also, Ref. Section 1.09**			



Step 1

- Using a 6 mm hex wrench, unscrew and remove SLIDER (Item 11) from UPPER PISTON (Item 8).

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6.02 REPLACEMENT: Upper Pin, continued

Step 2

- Once threads of SLIDER (Item 11) are disengaged from UPPER PISTON (Item 8) remove SLIDER (Item 11).
  - There will be some friction from SLIDER O'RING (Item 14).

Step 3

- Using a 6 mm hex wrench, unscrew SLIDER (Item 11) from PIN RETAINER (Item 13).
  - (Threads are right hand).

Step 4

- Remove PIN (Item 15) and UPPER SPRING PIN (Item 12).

NOTE 1

1. When assembling PIN RETAINER (Item 13) to SLIDER (Item 11), use Service Removable Loctite® for small threads.
2. Recommend that the SLIDER O'RING (Item 14) be replaced at this time.
   - Reference Instructions for replacement /service of SLIDER O'RING (Item 25) in Sec. 6.03.

END OF SECTION

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6.03 REPLACEMENT: Slider O'Ring

Step 1

- Using a pick, remove old SLIDER O'RING (Item 14) from SLIDER (Item 11) .
  - Put on new O'RING (Item 14).

CAUTION

In order that SLIDER O'RING (Item 14) is not twisted, carefully put pick between SLIDER O'RING (Item 14) and SLIDER (Item 11).

Step 2

- Use a circular motion around inside diameter of SLIDER (Item 11) with pick; this will help smooth out SLIDER O'RING (Item 14).

END OF SECTION

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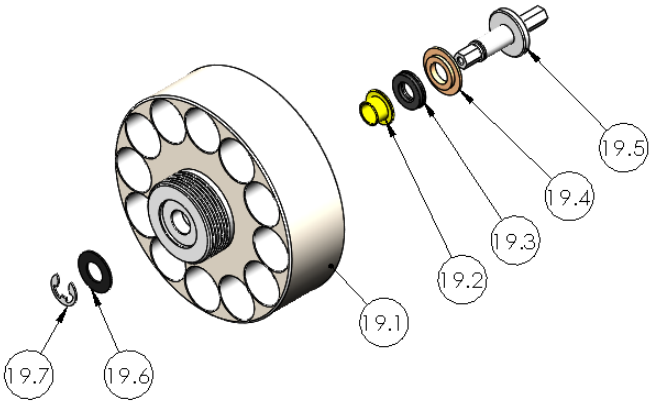
6.04 REPLACEMENT: Stem Cup Seal

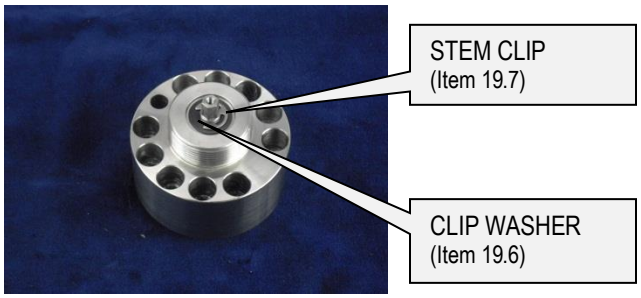
⚠CAUTION
Use care not to damage sealing surface on UPPER BODY (Item 19.1)
OR
Seal groove for Upper Body STEM CUP SEAL (Item 19.3).

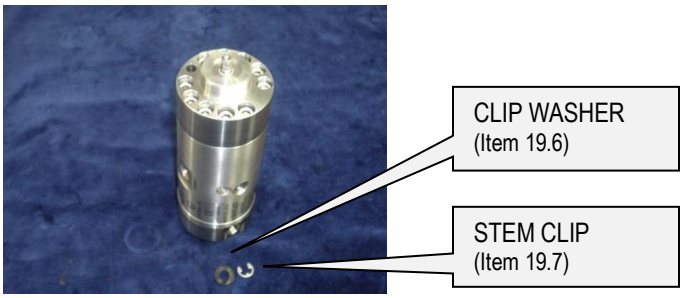
ITEM	PART	DESCRIPTION	QTY
19.7	00000273-0301-000	Stem Clip	1
19.6	00000272-0301-000	Clip Washer	1
19.1	00001992-0301-000	Upper Body	1
19.2	00001076-0301-000	Stem Bushing	1
19.3	00000009-0301-000	Stem Cup Seal	1
19.4	00000005-0301-000	Stem Rub Washer	1
19.5	00001075-0301-000	Stem	1
➢ **Also, Ref. Section 1.08**			



Step 1
- Unscrew M3 X 25 SHCS (Item 43).
  - ➢ Remove ADJUSTMENT HANDLE (Item 41), M3 LOCKWASHER (Item 42) and PANEL LOCK (Item 40).

Step 2
- Remove STEM CLIP (Item 19.7) and CLIP WASHER (Item 19.6) from STEM (Item 19.5).





Step 3
- Slide Stem Assembly free.

Step 4
- Using a wood or plastic pick, push STEM CUP SEAL (Item 19.3) out of UPPER BODY (Item 19.1).

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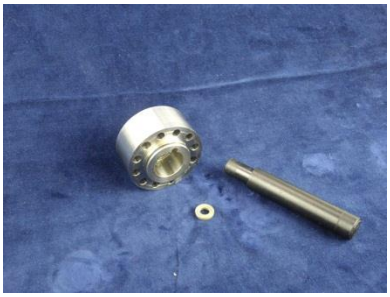
6.04 REPLACEMENT: Stem Seal, continued

Step 5

- Push STEM CUP SEAL (Item 19.3) into place **after** STEM (Item 19.5) is installed.



NOTE

To guarantee that STEM CUP SEAL (Item 19.3) is properly installed use special Cup Seal Tool (Part 00000009-1010-000) (Ref. Appendix A).

Step 6

- Recommend that UPPER BODY O–RING (Item 21) be replaced at this time.

CAUTION

When removing and/or replacing BODY O'RING (Item 21) take care to not damage seal groove of UPPER BODY (Item 19.1).

Step 7

- Re-assemble.

END OF SECTION

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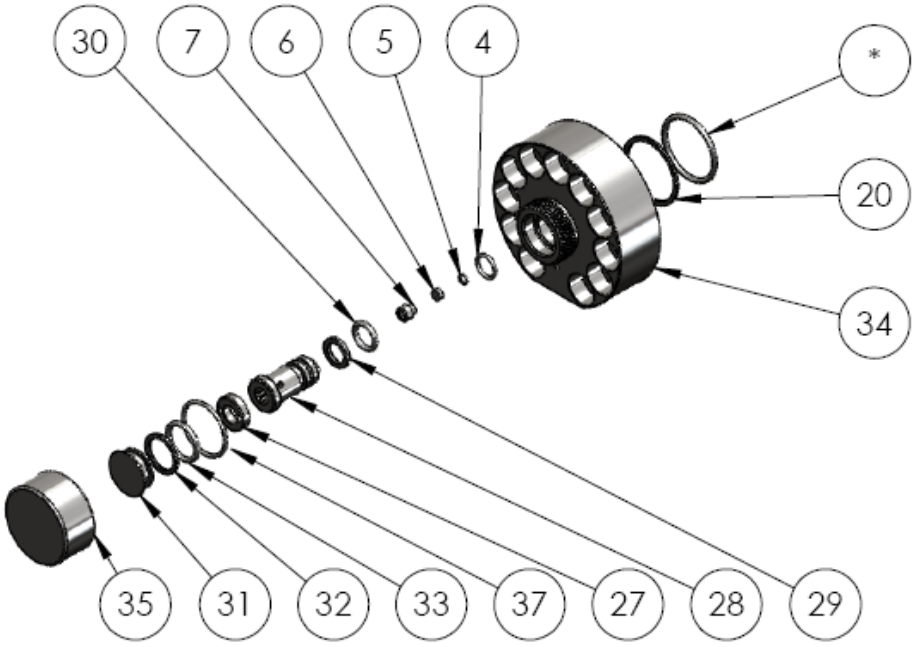
WARNING

REMOVAL OF LOWER SEAT HOLDER FROM VALVE WILL CAUSE LOSS OF CALIBRATION
AND
THE VALVE WILL NOT FUNCTION PROPERLY UNLESS RE-CALIBRATED BY FACTORY TRAINED PERSONNEL.



Lower seat removal by non-factory trained personnel will void any implied or stated warranty.

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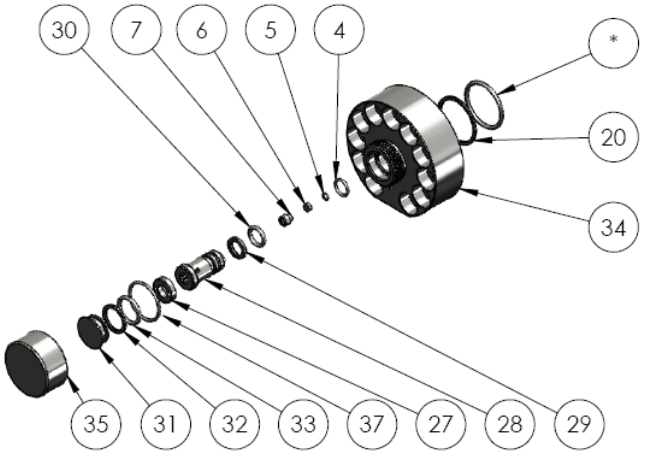
6.05 REPLACEMENT: Lower Seat Holder and/or Lower Seat Holder O'Ring

CAUTION
Use care NOT to scratch interior surface of LOWER SEAT HOLDER (Item 28) as this will cause valve to become inoperable.

OUTLET BODY			
ITEM	PART	DESCRIPTION	QTY
35	00000145-0301-000	Cap Closure	1
31	00001995-0301-000	Outlet Plug	1
32	00002361-0301-010	Outlet Plug Back-Up Ring	1
33	00001555-2115-007	Outlet Plug O-Ring	1
37	00001555-2024-000	Cap Closure O-Ring	1
27	00000153-0301-000	LSH Lock	1
28	00001994-0301-000	Lower Seat Holder	1
29	00001555-8111-003	Lower Seat Holder Back-Up Ring	1
34	00001993-0301-002	Outlet Body	1
20	00002360-0301-000	Outlet Body Back-Up Ring	1
21	00001555-2125-007	Outlet Body O-Ring	1
4	00001555-2013-003	Lower Seat Holder Guide	1
5	00000092-0301-002	Seat Seal	1
6	00000093-0301-XXX	Seat	1
7	00000094-0301-001	Seat Retainer	1
30	00001555-2111-003	Lower Seat Holder O-Ring	1
➢ **Also, Ref. Section 1.11**			



Step 1

- To seperate OUTLET BODY (Item 34) from CENTER BODY (Item 1), remove eleven (11) M10 x 30 SHCS (Item 39) using a 5 mm T-handle hex key.

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6.05 REPLACEMENT: Lower Seat Holder and/or Lower Seat Holder O'Ring, continued

Step 2

- Using calibers, measure height from top of LOWER SEAT HOLDER (Item 28) to top of OUTLET BODY (Item 34).

NOTE

If available, a depth micrometer is more accurate and easier to use rather than calibers especially when re-assembling.

Step 3

- Using an 8 mm (or 5/16") T-handle hex key; thread LOWER SEAT HOLDER (Item 28) out of OUTLET BODY (Item 34) as shown below.

Step 4

- Remove and replace LOWER SEAT O'RING (Item 30).

Step 5

- Re-assemble.
  - Use calibers (or depth micrometer) to ensure that LOWER SEAT HOLDER (Item 28) is at original height, as measured in Step 2.

END OF SECTION

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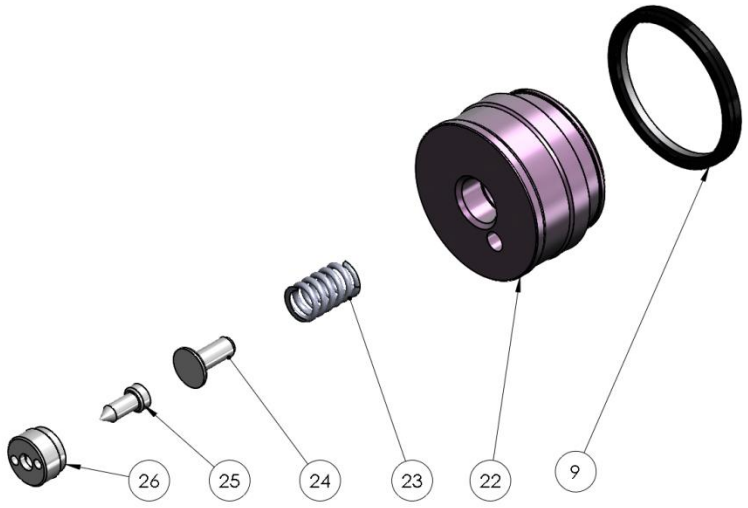
6.06 REPLACEMENT: Lower Piston Pin

LOWER PISTON			
ITEM	PART	DESCRIPTION	QTY
26	00000549-0301-000	Pin Enclosure	1
25	00000054-0301-XXX	Pin	1
24	00001923-0301-000	Lower Pin Spacer	1
23	00001997-0301-000	Lower Piston Spring	1
22	00000140-0301-000	Lower Piston Sub-Assy	1
9	00000146-0301-002	Piston Cup Seal	1
➢ **Also, Ref. Section 1.12**			



Step 1

- The LOWER PIN (Item 25), located in the LOWER PISTON (Item 22), is accessed by removing PIN ENCLOSURE (Item 26).

Step 2

- Placing the Lower Piston Tool (Part 00000549-1012-000) (Ref. Appendix A) into the fluid port on side of LOWER PISTION (Item 22) will prevent rotation.

Ref. PICTURE 1 & 2

PICTURE 1

PICTURE 2

END OF SECTION

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SECTION 7: RE-ASSEMBLY

7.01 VALVE RE-ASSEMBLY: Upper Body

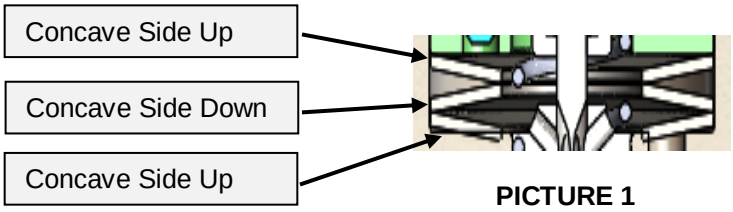
In general, to reassemble valve simply reverse order of disassembly.

- ***HOWEVER***, special attention should be taken in following area(s):

Step 1

CAUTION
Incorrect order of springs will cause valve to perform poorly.

- Ensure UPPER BELLEVILLE SPRING (Item 16) stack assembly is properly positioned within CENTER BODY (Item 1). Ref. PICTURE1
  - There are a total of three (3) springs.
  - Order of UPPER BELLEVILLE SPRINGS (Item 16) should be stacked concave to concave.



PICTURE 1

NOTE
Placement of springs.

Step 2

- Attach UPPER BODY (Item 19.1) to CENTER BODY (Item 1).
  - These must be assembled so they remain in cylindrical alignment.

Failure to observe caution here can cause permanent damage.

Step 3

- **CAUTION:** Several items must be in proper alignment to not damage any components:
  - SLIDER (Item 11) and UPPER PISTON (Item 8) screw together so they are in middle of travel range.
  - ANTI-ROTATE PIN (Item 10) aligned with groove in UPPER BODY (Item 19.1).
  - STEM (Item 19.5) aligned with hexed slot in SLIDER (Item 11).
    This is accomplished by temporarily attaching ADJUSTMENT HANDLE (Item 41) to STEM (Item 19.5) and rotating until stem hex and slider hex slip together.

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US PATENTS: 5,427,139 * 5,494,070 * 6,189,564,B1 * EU PATENT 1110132

7.01 VALVE RE-ASSEMBLY: Upper Body, continued

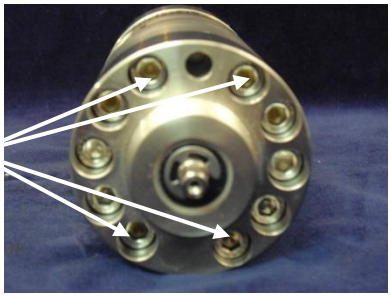
Step 4

Failure to observe caution here can cause permanent damage.

- Slightly cross tighten twelve (12) M10 X 30 SHCS (Item 39), beginning with four as shown below.

IMPORTANT
This is very important in order to prevent binding.

Start-up screws for cross tightening



- Once cross tightened, tighten all twelve (12) M10 x 30 SHCS (Item 39) to a torque setting of 150 inch lbs. (17N.m).

END OF SECTION

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7.02 VALVE RE-ASSEMBLY: Outlet Body

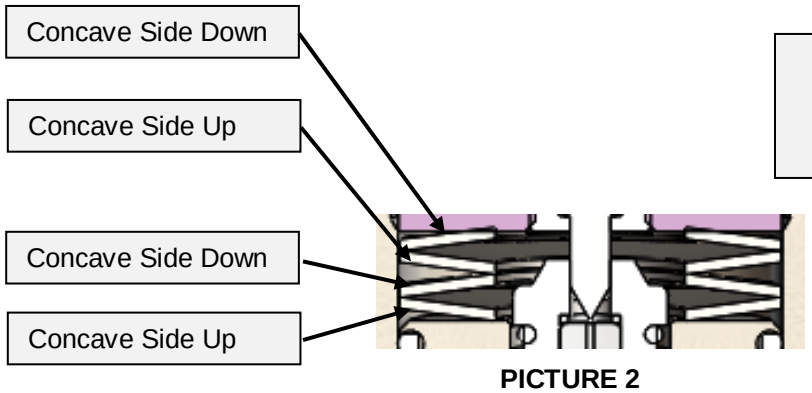
Step 1

- When re-assembling OUTLET BODY (Item 34) to CENTER BODY (Item 1):
  - Care must be taken to not damage PIN (Item 25).
  - The two body sections must be positioned square to each other in order to not bind PIN (Item 25) and LOWER SEAT HOLDER (Item 28).

Step 2

Failure to observe caution here can cause permanent damage.

- Order of LOWER BELLEVILLE SPRINGS (Item 16) should be stacked concave to concave. Ref. PICTURE 2
  - There are a total of four (4) springs.



NOTE
Placement of springs.

PICTURE 2

Step 3

Failure to observe caution here can cause permanent damage.

- Slightly cross tighten eleven (11) M10 X 30 SHCS (Item 39), beginning with four as shown below.

IMPORTANT
This is very important in order to prevent binding.

Start-up screws for cross tightening

- Once cross tightened, tighten all eleven (11) M10 x 30 SHCS (Item 39) to a torque setting of 150 inch lbs. (17N.m).

END OF SECTION

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SECTION 8: TROUBLESHOOTING

There are a variety of reasons that can cause ***Amflow®*** Valves to perform poorly or not work. Listed below are those most commonly encountered:

a. Springs installed incorrectly
b. Defective Upper Piston Seal
c. Defective Lower Piston Seal
d. Defective Slider Seal
e. Plugged Orifice
f. Clogged Filter
g. Isolation Valve in wrong position
h. Check Valve failure
i. Viscosity of Media too high
j. Defective Upper Seat Seal
k. Differential Pressure across valve set improperly
l. Trapped air
m. Upper Pin broken
n. Lower Pin broken

PROBLEM	PROBABLE CAUSE
No flow though valve	e, f, g, h, m
Flow rate will not stabilize	a, b, c, d, j, k, l, n
ADJUSTMENT HANDLE feels “rough” when turned	j
Maximum flow rate not achievable	a, e, f, i
Slow drift downwards in flow rate	b, d, l, n

END OF SECTION

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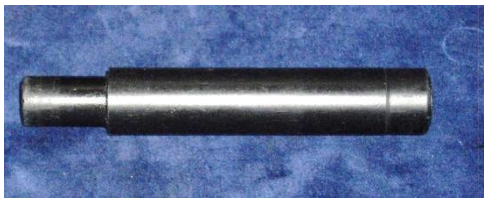
APPENDIX A
AMFLOW® TOOLS



Part : 00000009-1010-000
CUP SEAL TOOL
Used to assemble Stem Cup Seal & Center Body

Part : 00000549-1012-000
LOWER PISTON TOOL
Used to change Pin or Lower Piston Spring

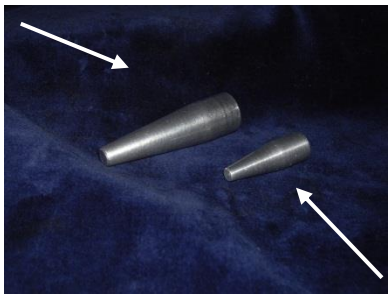
Part : 00000171-1010-000
SEAT HOLDER SEAL TOOL
Used to insert O'Rings on Upper and Lower Seat Holders

Part : 00000212-1012-000
STEM INSERTION TOOL
Used to install and remove stem and seat assemblies

Part : 00000126-1010-000
SLIDER O'RING TOOL
Used to install slider o'rings

AM7 Series and AM20 Valves

Part : 00000171-1010-000
SEAT HOLDER SEAL TOOL



Part : 00000126-1010-000
SLIDER O'RING TOOL

NOTE:
Contact manufacturer or manufacturer's representative to purchase specialized tools.

END OF SECTION

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STANDARDS

A&H Enterprises designs its products to meet the applicable **ASME,** and **API** standards for valve design and pressure vessels.

Products are also **CE** marked and **ATEX** approved for Hazardous area installations.

MEMBERSHIPS

CERTIFICATIONS

ATEX DIRECTIVE (94/9/EC)

In the interest of safety and quality, A & H Enterprises has certified its **Amflow®** series of valves for use in potentially explosive atmospheres as defined by the ATEX Directive (94/9/EC) as Category 2G.

ATEX
CE Ex II 2 G Ex d IIC T3
US PATENTS 5,427,139 * 5,494,070 * 6,189,564,B1 EU PATENT 1110132

To ensure the safety of all parties, the valves must be regularly checked for signs of fluid leaks. Only genuine ***Amflow®*** parts must be installed in accordance with supplied instructions, good engineering, and construction practices. The valve bodies are constructed from 316L and, therefore, must not be used with chemicals which are incompatible with 316L or with the seal materials used. The valves must not be modified in any way from the original purchased valves. The valves must only be operated in the range of pressure and temperature conditions indicated on product data sheet. This equipment is certified for Group 2 Category II. Equipment should not be used in systems requiring a higher level of certification.

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LIMITED WARRANTY

Each ***Amflow®*** product is warranted to be free from defects in material and workmanship under normal use and service. The warranty period is three (3) years and begins on the date of original purchase. This warranty extends only to the original buyer and does not apply to any product which, in A & H Enterprises' opinion, has been misused, altered, neglected, contaminated, damaged by accident or abnormal conditions of operation or handling.

At A & H Enterprises' option, the A & H Enterprises' warranty obligation is limited to the replacement or repair of a defective product that is returned to A & H Enterprises within the warranty period. Merchandise returned to A & H Enterprises within the warranty period which, in A & H Enterprises' opinion, is defective by accident, improper operation or improper handling shall be subject to a charge for repair. Merchandise, free from defects, returned to A & H Enterprises shall be subjected to a 20% restocking fee within thirty (30) days of the purchase date. Written authorization is required for all merchandise returned to A & H Enterprises.

To obtain warranty service, contact A & H Enterprises to obtain return authorization information. Then send the product to A & H Enterprises with a description of the difficulty, transportation and insurance prepaid. A & H Enterprises assumes no risk for damage in transit. Following warranty repair, the product will be returned to Buyer, transportation and insurance prepaid. If A & H Enterprises determines that failure was caused by neglect, misuse, contamination, alteration, accident, or abnormal condition of operation or handling, A & H Enterprises will provide an estimate of repair costs and obtain authorization before commencing the work. Following repair, the product will be returned to the Buyer, transportation and insurance prepaid, and the Buyer will be billed for the repairs and the return transportation and insurance charges.

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